

HW #7 - Ch12: #3-i,ii #5, #7-i,ii  
Ch13: #1-i,iv,vi #8-i,ii,iii

#3i.

~~XXXXXX~~

~~S~~  $S \rightarrow aX$   
 $X \rightarrow aX \mid bX \mid \Lambda$

$S \Rightarrow aX$       $aX$   
 $\Rightarrow a\Lambda$       $aaX$   
 $\Rightarrow a$       $aabX$   
               $aabbX$   
               $aabb\Lambda$   
               $aabb$

$(a+b)^*$

ii

$S \rightarrow XaXaX$   
 $X \rightarrow aX \mid bX \mid \Lambda$

$S \Rightarrow XaXaX$   
 $\Rightarrow aXaXaX$   
 $\Rightarrow abXaXaX$   
 $\Rightarrow ab\Lambda aXaX$

~~$(a+b)^* (aa+ab)^* (aab)^*$~~

$(a+b)^* (aa+ab)^* (aa+ab)^*$

$\Rightarrow aba\Lambda aX$   
 $\Rightarrow abaaX$   
 $\Rightarrow abaa\Lambda$   
 $\Rightarrow abaa$   
 $\Rightarrow abaa^*$

#5

$S \Rightarrow XbaaX$   
 $\Rightarrow XabaaX$   
 $\Rightarrow \del{X}abaaX$   
 $\Rightarrow abaaXb$   
 $\Rightarrow abaaXbb$   
 $\Rightarrow abaaabb$

$(a+b)^* (baa) (a+b)^*$



#7 i

$$\begin{aligned} S &\rightarrow aX \\ X &\rightarrow \Lambda / bX \end{aligned}$$

iii

$$\begin{aligned} S &\rightarrow Q \\ Q &\rightarrow baaQ / abbQ / \Lambda \end{aligned}$$

ii

$$\begin{aligned} S &\rightarrow XY \\ X &\rightarrow \Lambda / aX \\ X &\rightarrow bY / \Lambda \end{aligned}$$

Ch 13

#1 i

$$\begin{aligned} S &\rightarrow XX \\ X &\rightarrow aaX / bX / \Lambda \end{aligned}$$

iv.

$$\begin{aligned} S &\rightarrow XX \\ X &\rightarrow YbYb / \Lambda \\ Y &\rightarrow bY / \Lambda \end{aligned}$$

vi.

$$\begin{aligned} S &\rightarrow XaX / YbY \\ X &\rightarrow bX / \Lambda \\ Y &\rightarrow aY / \Lambda \end{aligned}$$

#8

i: Language defined by:  $(a+tb)^* a^*$

$$S \rightarrow aX / bX / aY / bY / a / b$$

$$X \rightarrow aX / a / bX / b$$

$$Y \rightarrow aY / a / bY / b$$

8.  
ii

Language defined by:  $(aaa)^+$

$S \rightarrow aX$   
 $X \rightarrow aY$   
 $Y \rightarrow aZ | a$   
 $Z \rightarrow aaZ | a$

8.  
iii

Language defined by  $(aa)^+$

~~same as ii~~

$S \rightarrow aX$   
 $X \rightarrow aY | a$   
 $Y \rightarrow aaY | aa$